IEEE 802.18

Radio Regulatory-TAG

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| Radio Regulatory Technical Advisory Group Minutes | | | |
| Date: 19aug21 | | | |
| Name | Affiliation | Address | Email |
|  |  |  |  |
| Author and Officer presiding: | | | |
| Jay Holcomb,  Chair, RR-TAG | Itron | Liberty Lake, (Spokane) WA | jholcomb@ieee.org |

Co-Vice-chairs are [Stuart Kerry (OK-Brit/Self)](mailto:stuart@ok-brit.com) and [Al Petrick (Skyworks Solutions)](mailto:apetrick@ieee.org)

Abstract

Minutes of the IEEE 802 RR-TAG teleconference

These are the Minutes of the IEEE 802 RR-TAG teleconference Thursday, 19aug21

1. Chair calls the meeting to order at 15:02 et
2. Chair presents slides 2 – 6 of 802.18-21/0098r01, the call to order and administrative items
   1. Includes IEEE 802 meeting and participant’s guidelines and requirements.
3. Chair presents slides 7, the agenda:
   1. Call to Order
      1. Attendance is not on IMAT (w/VC & webex)
      2. Remember to mute when not speaking, thanks.
      3. Please request Q in the chat window.
   2. Administrative items
      1. Someone to take some notes, Al P.
      2. Attendance & monitor chat window, Stuart K
   3. Approve agenda, last minutes & announcements.
   4. Discussion items
      1. EU Items
      2. Other Regions Items
      3. ITU-R Items
      4. FCC NPRM on 60GHz
      5. General Discussion Items
   5. Actions required.

      2. Anything new today
      3. ongoing: WRC-23 AI Viewpoints & Freq. table fill in
   6. AOB
   7. Adjourn
4. Chair presents slides 8 - 10 Administrative – Motions and more
   1. **Motion: To approve the agenda as presented on previous slide**

Moved by: Stuart Kerry (OK-Brit, self)

Seconded by: Hassan Yaghoobi (Intel)

Discussion? None

Vote: Approved by unanimous consent

* 1. **Motion:** To approve the minutes in document <https://mentor.ieee.org/802.18/dcn/21/18-21-0096-00-0000-minutes-12aug21-rrtag-teleconference.docx> 13-Aug-2021 18:35:46 ET, with editorial privilege for the 802.18 chair..

Moved by: Al Petrick (Skyworks)

Seconded by: Ben Rolfe (Blindcreek Assoc.)

Discussion? None

Vote: Approved by unanimous consent

* 1. **Administrative moving forward** 
     1. **For Sept 2021,** Wireless Interim Session, it will be electronic, with one ($50, $75, $125) registration fee for all groups.
        1. Dates are Friday 10sep21 to our .18 meeting on 23sep21. 802..18 will meet our normal Thursday’s, 16th and 23rd.
           1. **On the 16th, overlaps with last 30 minutes of 802.11az and 802.11bh; also the first hour of 802.15.4ab**
        2. Looking at a wireless session opening meeting Friday 10sep21 at 0900et (similar to what was done at f2fs )
        3. Draft agenda for Sept 10th 802 Wireless Plenary is here: <https://mentor.ieee.org/802-ec/dcn/21/ec-21-0140-02-WCSG-2021-09-wireless-interim-opening-plenary-agenda.xlsx>
        4. From WCSC on 07July: $50 – 14jul-27aug; $75 – 28aug-09sep; $125 >09sep;
        5. The September 2021 electronic wireless interim session registration is open:
        6. <http://802world.org/wireless/> REGISTRATION WEBSITE:  <https://cvent.me/NxZeZx>
     2. **Note: As sent on list server on 12Aug21: With IEEE 802 rules committee working toward clarifying Interim voting participation credit:** 
        1. Proposed clarification: A credited interim session (an interim session with attendance credit) is one that has been declared by the Working Group Chair or Technical Advisory Group Chair.
     3. **and with this Wireless Interim being setup as a full Wireless Interim session, at this time 802.18 will be declared as a credited interim session and will be taking attendance using IMAT and it will count for voting membership participation credit. (watch for possible updates later)**
     4. For **Nov 2021** Plenary – Vancouver – will be addressed at the EC call on 07Sep21
     5. For **Jan 2022** Wireless Interim – Panama – will be addressed at the WCSC call on 01Sep21
     6. **Coming up Straw polls:**  Mentor ePolls maybe working for one question at a time so can start later now
        1. voting members should have gotten a test ePoll.
     7. Reminder: everyone can vote in a straw poll and these are not hybrid/mixed mode meetings.
     8. Straw poll-Vancouver(again:): Will you attend the 2021 November IEEE 802 Plenary if held in-person at the Hyatt Regency Vancouver, in Vancouver, Canada Nov 14-19, 2021?
        1. Plan to run from 25aug-05sep21, for EC on 07sep
     9. Straw poll-Panama: Will you attend the 2022 January IEEE 802 Wireless Interim if held in-person at the Hilton Panama, Panama City, Panama Jan 16-21, 2022?
        1. Plan to run 20-30aug21 for WCSC 01sep)
     10. Note: USA limits recognized vaccinations, this may affect folks coming into or going through USA.
         1. Note: recognized for in country vaccinations, versus accepted for folks going through USA may differ, always check latest.
     11. Canada as of last week does accept the Astra Zeneca, this of course can change.

1. Chair presents slides 11 - 13, **EU items to share**
   1. **ETSI –** [<BRAN>](https://portal.etsi.org/tb.aspx?tbid=287&SubTB=287) **next meeting #111 27sep-01oct21; ad hocs #110a-f;** 05,11aug; 09**, 01,02,06,**07**sep21**
      1. From last week, 12aug21: any questions or updates? Discussed a little on the CDC, clarity and all.
      2. EN 302 567 – C1 band/60GHz (WiGig, .11ad and .11ay) has passed 2nd ENAP, it is now an approved standard, next is to EC to approve for the OJEU.
      3. EN 303 722 – C3 band/60GHz has been reviewed by EC assessment and will go out for 1st ENAP now.
      4. EN 301 598 - TVWS, has been on hold due to UAR, User Access Restrictions, and was not sure EC was okay. They are okay now. working on a revision, then 07Sep21 – ad hoc on this standard to discuss about going to ENAP.
      5. EN 301 893 – 5GHz, meetings going on and good progress on energy detect threshold agreements.
      6. For Country Determination Capability (CDC) in 5.8 GHz band, some countries are starting to open this band for license exempt use Different countries at different power levels:
         1. Some are going under the older harmonized standards, this is the lower power for SRD - EN 300 440 w/ no CDC.
         2. CDC is in an Annex of the EN 301 893 and to use the higher power CDC will be mandatory. (to protect the incumbents)
      7. EN 303 687 - 6 GHz, a discussion item on NB FH technologies which is already in the mandated standard now in OJEU 6GHz (for 01Dec21 implementation).
         1. In he 802.11 SC CoEx there are submission documents in Mentor (docs 11-814 and 11-1191), on this.
         2. ad hocs, on 02 and 06 Sept will discuss these. and the NB FH. and setting up for discussion at full plenary #111.
      8. ad hoc on 01sept will discuss 6GHz client to client communications, ECC was clear to have at LPI, ETSI to define how.
         1. e.g. LPI and how to use it, (e.g. if in range of a LPI AP) or does it revert to VLP for indoor and outdoor.
      9. EN 303 753 - 3rd 60GHz standard progressing and current poll is closing now.
      10. Nominations for chair of BRAN closes 27aug21..
      11. Germany, Iceland, Norway are already opening up 6GHz, as it is volunteer now.
   2. General EU info: [<ojeu>](https://eur-lex.europa.eu/oj/direct-access.html) [<HStds>](https://ec.europa.eu/growth/single-market/european-standards/harmonised-standards/) <https://www.etsi.org/deliver/etsi_en/>
      1. Remember – BRAN documents can be found in the 802.11 private area documents (daily refresh)
   3. **ETSI – ERM** [**<TG-UWB>**](https://portal.etsi.org/tb.aspx?tbid=729&SubTB=729) **next call, meeting #59, \_(some focused calls in sept.)\_**
      1. Anything to share today? not today.
      2. 15jul: Working on new SR doc to extend UWB to 12.4 GHz, (tbd), much broader, up to 4 GHz OBW (tbd).
   4. **ETSI –** [**<BRAN>**](https://portal.etsi.org/tb.aspx?tbid=287&SubTB=287) **next meeting #111 27sep-01oct21; ad hocs #110a-f; 05, 11aug; 09, 01,02,06,07sep21**
      1. see above.
   5. **Note:** message from CEPT president, that looking at allowing some physical face-2-face meetings sometime after 01sept but have to allow remote attendees so a hybrid. and the face2face portion will have restrictions.
   6. **CEPT – ECC** [<SE19>](https://cept.org/ecc/groups/ecc/wg-se/se-19/client/introduction/) **next call #88 30Sep-01Oct21**
      1. Anything to share today? not today.
      2. 15jul: Some looking at UWB and fixed services interference mitigation. Sweden is pushing the issue, very political discussion.
   7. **CEPT–ECC** [<SE24>](https://cept.org/ecc/groups/ecc/wg-se/se-24/client/introduction/) **next virtual meeting, #M104 25-27Aug21**
      1. Anything to share today? not today.
      2. 15jul: SE-24-UWB working on new regulations by end of year for >6GHz. Includes items, fixed outdoor, okay in vehicles, higher power (-31.2dBm/MHz indoor), etc. See ECC report 327. This could be significant changes. More to come.
   8. **CEPT – ECC** [<SE45>](https://cept.org/ecc/groups/ecc/wg-se/se-45/client/introduction/) **next call #14 28-29Oct21**
      1. Anything to share today? not today.
      2. **15jul:** The next call is about OOBE at 5935 MHz
   9. **CEPT – ECC** [<FM57>](https://cept.org/ecc/groups/ecc/wg-fm/fm-57/client/introduction/) **next call #16 14-15Sep21**
      1. Anything to share today? not today.
2. Chair presents slide 14, **Other regions (outside EU-Stds and USA), items to share**
   1. **Chili –** SUBTEL - Amendments to Regulation Resolución 1985
      1. Low power APs (Access Points) with internal batteries may operate outdoors in the 5925 - 7125 MHz frequency band, with maximum output power of 17 dBm EIRP.
   2. **Malaysia – MCMC – released a public consultation on the 12th:**
   3. They are looking for input to allocate the entire 6GHz band (5925 MHz to 7125 MHz) or the lower 500 MHz (5925 MHz to 6425 MHz) in Malaysia. Comments due 11Oct21.
   4. Anything else to share today? not today
3. Chair presents slide 15, **ITU-R items to share**
   1. As explained at the 802.15 July closing plenary, Monday, August 23, 11-13 CEST, there is a joint TG13+TG7a meeting to develop the response letter of 802.15 to the ITU-R liaison statement in [https://mentor.ieee.org/802.18/dcn/21/18-21-0080-00-0000-request-for-information-itu-r-wp-1a.docx](https://urldefense.com/v3/__https:/mentor.ieee.org/802.18/dcn/21/18-21-0080-00-0000-request-for-information-itu-r-wp-1a.docx__;!!F7jv3iA!mFFR8YaL6iYkfMrvk5D-BEmYOsf2jyyRI63eI6NNg3yjAJzPwRHSkuCkxQHcyiYVtQ$) .
      1. A first draft of the response letter should be available, then will be discussed jointly next Monday in 802.15 and then it will be further handled by 802.18 who received the letter and will send out the reply.
   2. **WRC-23 agenda items, the list is on the ITU-R website at:** 
      1. <https://www.itu.int/en/ITU-R/study-groups/rcpm/Pages/wrc-23-studies.aspx> (updated 26Aug20)
         1. <https://www.itu.int/dms_pub/itu-r/oth/0c/0a/R0C0A00000D0041PDFE.pdf>
         2. <https://mentor.ieee.org/802.18/dcn/20/18-20-0107-01-0000-res-811-wrc-19-wrc-23-agenda-items.docx>
   3. **IEEE 802 viewpoints on WRC-23 agenda items.** 
      1. Doc for viewpoints updated (actions items in notes on this slide in agenda): <https://mentor.ieee.org/802.18/dcn/21/18-21-0039-01-0000-ieee-802-viewpoints-on-wrc-23-agenda-items.pptx>
      2. Do we have all the ITS folks on to review?
         1. How can we watch / what bodies about any possible expansion of the ITS bands (globally) e.g. to 4.9GHz?
         2. WRC-23 Agenda Item 1.1 – *Watch CPG in EU and will hear from them if any discussions come up on expansion of ITS.*
            1. *Watch other regional bodies also.*
      3. Reference:
         1. btw- the initial AIs to consider IEEE 802 viewpoints:
            1. 1.1 -800-4 990 MHz and Resolution 223. Connection w/ITS going there?
            2. 1.2 -300-3 400MHz, 3 600-3 800MHz, 6 425-7 025MHz, 7 025-7 125MHz and 10.0-10.5GHz for International Mobile Telecommunications (IMT) and resolution 245.
            3. 1.5 -470-960 MHz in Region 1-consider possible regulatory actions, Resolution **235.**
            4. 10 **-**recommend to the Council items for inclusion in the agenda for the next WRC
   4. For the 4 open ITU –R liaisons to WP 1A and WP 5A, see back up slides in this agenda. All due to the WPs in November 2021.
   5. For miscellaneous links for ITU-R , SGs, WPs and calendars, see back up slides later.
4. Chair presents slides 16, **FCC NPRM on 60GHz on Radar Sensing Technology**
   1. Allowing Expanded Flexibility and Opportunities for Radar Operation in the 57-64 GHz band
      1. Notice of Proposed Rulemaking – ET Docket No. 21-264
   2. <https://mentor.ieee.org/802.18/dcn/21/18-21-0079-00-0000-fcc-nprm-allowing-expanded-flexibility-for-radar-operation-in-57-64-ghz-band.docx> 44 seek comments
   3. Abstract in notes on this slide.
   4. Proceeding: [https://www.fcc.gov/ecfs/search/filings?q=((proceedings.name:((21%5C-264\*))%20OR%20proceedings.description:((21%5C-264\*))))&sort=date\_disseminated,DESC](https://www.fcc.gov/ecfs/search/filings?q=((proceedings.name:((21%5C-264*))%20OR%20proceedings.description:((21%5C-264*))))&sort=date_disseminated,DESC)
   5. It is now adopted by the FCC commission, has not be published in Federal Register yet.
   6. .11bf, is looking at the NPRM below.
   7. .11 CoEx, had a presentation in this plenary, <https://mentor.ieee.org/802.11/dcn/21/11-21-1089-00-coex-coexistence-between-radars-and-communication-systems-in-the-60ghz-band-u-s-update.pptx> and had some concerns on the proposed rules.
   8. .15.4ab will put on their next call, 03aug21, to discuss.
   9. Came out today (19aug21) **Comments due 20Sept21 and reply comments due 18Oct21**
   10. **FR Document:** [**2021-16637**](https://urldefense.com/v3/__https:/www.federalregister.gov/documents/2021/08/19/2021-16637/fcc-seeks-to-enable-state-of-the-art-radar-sensors-in-60-ghz-band?utm_campaign=subscription*mailing*list&utm_source=federalregister.gov&utm_medium=email__;Kys!!F7jv3iA!kCOcNUzUR0qsvQP1rN9qBeWaPxLRXryhg4U02CqEFT8zp60I7zdtCWeOkNoMDxVRbg$)**; Citation: 86 FR 46661;** [PDF](https://urldefense.com/v3/__https:/www.govinfo.gov/content/pkg/FR-2021-08-19/pdf/2021-16637.pdf?utm_source=federalregister.gov&utm_medium=email&utm_campaign=subscription*mailing*list__;Kys!!F7jv3iA!kCOcNUzUR0qsvQP1rN9qBeWaPxLRXryhg4U02CqEFT8zp60I7zdtCWeOkNrPJarxaw$) **Pages 46661-46672 *(12 pages)*;** [Permalink](https://urldefense.com/v3/__https:/www.federalregister.gov/d/2021-16637?utm_medium=email&utm_campaign=subscription*mailing*list&utm_source=federalregister.gov__;Kys!!F7jv3iA!kCOcNUzUR0qsvQP1rN9qBeWaPxLRXryhg4U02CqEFT8zp60I7zdtCWeOkNp91K_sRw$)
       1. Comments would be best to be approved in .18 on 02Sep (2 weeks from now), for a 10-day EC ballot.
       2. If 09Sep, then needs an early close EC ballot.
       3. If comment text comes in, will probably need multiple off-line calls to work on the submittal.
5. Chair presents slide 17, **General Discussion Items - fyi**
   1. Protecting Against National Security Threats to the Communications Supply Chain through the Equipment Authorization Program and the Competitive Bidding Program
   2. FR Document: [2021-16087](https://urldefense.com/v3/__https:/www.federalregister.gov/documents/2021/08/19/2021-16087/protecting-against-national-security-threats-to-the-communications-supply-chain-through-the?utm_source=federalregister.gov&utm_medium=email&utm_campaign=subscription*mailing*list__;Kys!!F7jv3iA!kCOcNUzUR0qsvQP1rN9qBeWaPxLRXryhg4U02CqEFT8zp60I7zdtCWeOkNot_5cwtg$); Citation: 86 FR 46641; [PDF](https://urldefense.com/v3/__https:/www.govinfo.gov/content/pkg/FR-2021-08-19/pdf/2021-16087.pdf?utm_campaign=subscription*mailing*list&utm_source=federalregister.gov&utm_medium=email__;Kys!!F7jv3iA!kCOcNUzUR0qsvQP1rN9qBeWaPxLRXryhg4U02CqEFT8zp60I7zdtCWeOkNrRw_eOtA$) Pages 46641-46644 *(4 pages)*; [Permalink](https://urldefense.com/v3/__https:/www.federalregister.gov/d/2021-16087?utm_source=federalregister.gov&utm_medium=email&utm_campaign=subscription*mailing*list__;Kys!!F7jv3iA!kCOcNUzUR0qsvQP1rN9qBeWaPxLRXryhg4U02CqEFT8zp60I7zdtCWeOkNp2inWkWg$)
      1. Abstract: The Commission seeks comment on how to leverage its equipment authorization program to encourage manufacturers who are building devices that will connect to U.S. networks to consider cybersecurity standards and guidelines.
   3. FR Document: [2021-16085](https://urldefense.com/v3/__https:/www.federalregister.gov/documents/2021/08/19/2021-16085/protecting-against-national-security-threats-to-the-communications-supply-chain-through-the?utm_source=federalregister.gov&utm_medium=email&utm_campaign=subscription*mailing*list__;Kys!!F7jv3iA!kCOcNUzUR0qsvQP1rN9qBeWaPxLRXryhg4U02CqEFT8zp60I7zdtCWeOkNoHNsm4NA$); Citation: 86 FR 46644; [PDF](https://urldefense.com/v3/__https:/www.govinfo.gov/content/pkg/FR-2021-08-19/pdf/2021-16085.pdf?utm_source=federalregister.gov&utm_medium=email&utm_campaign=subscription*mailing*list__;Kys!!F7jv3iA!kCOcNUzUR0qsvQP1rN9qBeWaPxLRXryhg4U02CqEFT8zp60I7zdtCWeOkNofALY9Sg$) Pages 46644-46661 *(18 pages);* [Permalink](https://urldefense.com/v3/__https:/www.federalregister.gov/d/2021-16085?utm_source=federalregister.gov&utm_medium=email&utm_campaign=subscription*mailing*list__;Kys!!F7jv3iA!kCOcNUzUR0qsvQP1rN9qBeWaPxLRXryhg4U02CqEFT8zp60I7zdtCWeOkNoScrFFuQ$)
      1. Abstract: The Commission proposes to revise rules related to its equipment authorization processes to prohibit authorization of any ``covered'' equipment on the recently established Covered List. The Commission also seeks comment on whether to require additional certification relating to national security from applicants who wish to participate in the Commission's competitive bidding auctions. This action explores steps the Commission can take to further its goal of protecting communications networks...
6. Chair presents slide 18, **General Discussion Items – ongoing - MSGs 6 GHz**
   1. The WInnforum “6 GHz Committee”, all groups meet every 2 weeks except interference-weekly (168 people)
      1. <https://www.wirelessinnovation.org/6ghz-multistakeholder-committee>
      2. For access to documents from the committee, can request to be an observer from the MSG below.
      3. New org: 2 (now) focus areas:
         1. ) AFC Functional Specification -WG – includes: Interference-TG, Incumbent Info-TG, security (new) and Protocols 3GPP-TG
         2. 2) AFC Test and Certification-WG
      4. Anything to share today? not today
   2. 2. From the FCC R&O, an informal MSG (“Group”) has also been formed. (260+ people)
      1. <https://groups.wirelessinnovation.org/wg/6MSG/dashboard>.
      2. Work stream 1-interference protection and resolution (CableLabs, EPRI, Lake Cty, APCO) Meets biweekly, from 28Jan21-10:00 et,
      3. Work stream 2 - correct incumbent data (ULS) (Comsearch, APCO)
      4. Work stream 3 - AFC and how it provides protection, etc. (Charter, Google, UTC)
      5. Overall Co-chairs: NPSTC, UTC, WFA, WISPA.
      6. Anything to share today? not today
7. Chair presents slide 19, **General Discussion Items – ongoing - Table of IEEE 802 Stds Frequency Bands**
   1. **Problem statement**
      1. It is difficult for 802 wireless standards developers to quickly and accurately identify all the frequency bands by the family of 802 wireless standards in a regularly maintained database.
      2. The primary application is to simplify identification of potential frequency bands for coexistence assessment.
   2. **Initial Audiences:** 
      1. 1) 802 wireless standards developers
      2. 2) 802.19 wireless coexistence working group
   3. **Ad hoc calls** 
      1. **The spreadsheet is going, always look for latest:**
      2. <https://mentor.ieee.org/802.18/dcn/21/18-21-0036-07-0000-frequency-table-template.xlsx>
   4. **From ad hoc call on 27jul21**
      1. Reviewed the draft of rev07
         1. In instructions:
            1. Clarified Standard-Year and put in an example.
            2. Clarified PHY Amendment (Date of Initial Approval) with an example and to not leave blank, copy over the standard if there is no amendment.
            3. Clarified PHY Name to start with the Acronym, then the name.
         2. In notes: Added a general note to only consider Active standards, not in active-withdrawn standards.
   5. The activity is entering the phase to fill in the sheet now, so more intense and time consuming.
   6. **Note: ad hoc next week for 26aug21 is cancelled.**
   7. The next meeting will be 28sep21. (call-in in backup slides here)
8. Chair presents slide 20, **Actions Required**
   * Chair update NPRM on 60 GHz in mentor.
   * **Chair start straw polls on nov plenary and jan interim(1-done).**
   * **60 GHz NPRM, looking for initial comment responses, only have 2 or 3 weeks to finalize comments.**

ongoing:

* + For IEEE 802 viewpoints on WRC-23 AIs, reach out to those identified, looking for input on the viewpoints.

1. Chair presents slide21 Any Other Business
   1. none heard
2. Chair presents slide 22, Adjourn.
   1. **Next “weekly” teleconference (sched’d to 13jan22): 02sep –*15:00–<15:55* et – {no call on 26aug}**
      1. Call in info: [https://mentor.ieee.org/802.18/dcn/16/18-16-0038-18-0000-teleconference-call-in-info.pptx](https://mentor.ieee.org/802.18/dcn/16/18-16-0038-17-0000-teleconference-call-in-info.pptx)
      2. Also, see back up slide in this agenda.
      3. **note: new call-in starting 09sep21, see back up slides in agenda**
      4. All late changes/cancellations will be sent out to the 802.18 list server.
   2. Overall IEEE 802 schedule: <http://ieee802.org/802tele_calendar.html>
      1. or only 802.18: [IEEE 802.18 TAG Calendar](https://calendar.google.com/calendar/embed?src=c2gedttabtbj4bps23j4847004%40group.calendar.google.com&ctz=America%2FNew_York)
   3. Adjourn:
      1. Any objection to Adjourn.
      2. None heard, Adjourn at 15:37et
   4. The next face to face meeting is tbd.
   5. **The next IEEE 802.18 (wireless) interim will be electronic in Sept 2021**
   6. **The next IEEE 802 (ec call 07sep to decide on electronic or f2f) plenary will be in November 2021**
   7. Thank You
3. Attendance

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Voting Attendees:** |  | |  |
| 1 | **Auluck** | Vijay | | Self |
| 2 | **Ecclesine** | Peter | | Cisco Systems, Inc. |
| 3 | **Holcomb** | Jay | | Itron Inc. |
| 4 | **Kenney** | John | | TOYOTA InfoTechnology Center U.S.A. |
| 5 | **Kerry** | Stuart | | OK‐Brit, Self |
| 6 | **Levy** | Joseph | | InterDigital, Inc. |
| 7 | **Lynch** | Michael | | MJ Lynch & Associates, LLC. |
| 8 | **Nikolich** | Paul | | Self, HPE, Huawei, Wyebot, UNH BCoE, YAS BBV, Origin Wireless |
| 9 | **Petrick** | Al | | Skyworks Solutions Inc. |
| 10 | **Pirhonen** | Riku | | NXP Semiconductors |
| 11 | **Rolfe** | Benjamin | | Blind Creek Associates |
| 12 | **Yaghoobi** | Hassan | | Intel Corporation |
| 13 | **Yucek** | Tevfik | | Qualcomm |
|  |  |  | |  |
|  | **Non-Voting Attendees:** | |  |  |
| 1 | **Aldana** | Carlos | | Facebook |
| 2 | **Fang** | Yonggang | | MediaTek |
| 3 | **Lumbatis** | Kurt | | ARRIS/CommScope |
| 4 | **Ward** | Lisa | | Rohde & Schwarz |